

## CLAIMS

What is claimed is:

1. An electrical pressure washer comprising:
  - a water inlet port for receiving water from a water source;
  - a water outlet port;
  - an electrical motor in fluid communication with the water inlet port and the water outlet port for pressurizing the water received through the water inlet port and pump the pressurized water through the water outlet port;
  - an application wand connected to the water outlet by a hose and having a nozzle for outputting a pressurized water stream;
  - a power cord having a plug at a distal end for connecting AC power to the electrical motor;
  - a diagnostic circuit for detecting a voltage drop over the power cord and determining an operation condition based on the voltage drop; and
  - an indication panel having at least one indicator light for indicating the operation condition.
2. An electrical pressure washer as in claim 1, wherein the operation condition detected by the diagnostic circuit is that the electrical motor is in normal operation.
3. An electrical pressure washer as in claim 1, wherein the operation condition detected by the diagnostic circuit is that a water pressure at the water input port is low.
4. An electrical pressure washer as in claim 1, further comprising a chemical tank for storing a liquid detergent, and wherein the operation condition detected by the diagnostic circuit is that the pressure washer is in a mode of extracting the liquid detergent from the chemical tank for mixing in the water stream.

5. An electrical pressure washer as in claim 1, wherein the operation condition detected by the diagnostic circuit is that a thermal protection circuit of the electrical motor is open for protecting the electrical motor from overheating.

6. An electrical pressure washer as in claim 1, wherein the operation condition detected by the diagnostic circuit is that an AC voltage at the electrical motor is low.

7. An electrical pressure washer as in claim 1, wherein the plug of the power cord has a ground fault circuit interrupter.

8. An electrical pressure washer as in claim 1, further including a sensing wire connecting the diagnostic circuit to the distal end of the power cord for detecting the voltage drop over the power cord.

9. An electrical pressure washer as in claim 8, wherein the voltage drop is measured over a return wire of the power cord.

10. An electrical pressure washer as in claim 8, wherein the diagnostic circuit further detects whether a breaker of the ground fault circuit interrupter is open.

11. An electrical pressure washer as in claim 10, wherein the diagnostic circuit further detects whether an AC voltage is present at the plug before the ground fault circuit interrupter.

12. An electrical pressure washer as in claim 11, wherein the plug further includes a light emitter on an input end of the plug and an optical receiver connected to the sensing wire, the light emitter emitting light when an AC voltage is present at the plug.

13. An electrical pressure washer as in claim 1, wherein the indication panel has a plurality of light emitting diodes operated by the diagnostic circuit for indicating different operation conditions detected by the diagnostic circuit.

14. An electrical pressure washer as in claim 13, wherein a subgroup of the light emitting diodes are wired in series.

15. An electrical pressure washer as in claim 14, wherein each light emitting diode in the subgroup has a bypass transistor connected in parallel with said each light emitting diode for selectively diverting current away from said each light emitting diode.

16. An electrical pressure washer as in claim 15, wherein the diagnostic circuit includes a backup capacitor for powering the diagnostic circuit in absence of AC power, and wherein the backup capacitor is connected in series to the light emitting diodes in the subgroup such that a current for energizing the light emitting diodes also charges the backup capacitor.

17. An electrical pressure washer as in claim 1, wherein the diagnostic circuit includes operational amplifiers for determining the operation condition based on the pressure drop.

18. An electrical device comprising:

an electrical motor;

a sensing circuit; and

a power cord having a plug at a distal end for connecting AC power to the electrical motor, the power cord having a Hot wire, a Return wire, a Ground wire, and a sending wire connected to the sensing circuit for the sensing circuit to detect a voltage at the plug.

19. An electrical device as in claim 18, wherein the sensing circuit senses a voltage drop over the Return wire by detecting the voltage at the plug, the voltage drop being indicative of an amount of current drawn by the electrical motor.

20. An electrical device as in claim 19, wherein the electrical device is a pressure washer comprising:

a water inlet port for receiving water from a water source;

a water outlet port, wherein the electrical motor is in fluid communication with the water inlet port and the water outlet port for pressurizing the water received through the water inlet port and pump the pressurized water through the water outlet port; and

an application wand connected to the water outlet by a hose and having a nozzle for outputting a pressurized water stream.

21. An electrical device as in claim 20, wherein the sensing circuit detects an operation condition of the pressure washer based on the voltage drop, and wherein the pressure washer further includes an indication panel having at least one indicator light for indicating the detected operation condition.

22. An electrical device as in claim 20, wherein the operation condition detected by the sensing circuit is that the electrical motor is in normal operation.

23. An electrical device as in claim 21, wherein the operation condition detected by the sensing circuit is that a water pressure at the water input port is low.

24. An electrical device as in claim 21, wherein the pressure washer further includes a chemical tank for storing a liquid detergent, and wherein the operation condition detected by the sensing circuit is that the pressure washer is in a mode of extracting the liquid detergent from the chemical tank for mixing in the water stream.

25. An electrical device as in claim 21, wherein the operation condition detected by the sensing circuit is that a thermal protection circuit of the electrical motor is open for protecting the electrical motor from overheating.

26. An electrical device as in claim 18, wherein the plug of the power cord has a ground fault circuit interrupter, and wherein the sensing circuit further detects through the sensing wire whether a breaker of the ground fault circuit interrupter is open.

27. An electrical device as in claim 26, wherein the sensing circuit further detects through the sensing wire whether an AC voltage is present at the plug before the ground fault circuit interrupter.

28. An electrical device as in claim 27, wherein the plug further includes a light emitter on an input end of the plug and an optical receiver connected to the sensing wire, the light emitter emitting light when an AC voltage is present at the plug.

29. An electrical device comprising:  
an indication panel has a plurality of light emitting diodes; and  
a control circuit for operating the light emitting diodes to selectively turn each of the light emitting diodes on and off, wherein the light emitting diodes are wired in series, and wherein the control circuit has a plurality of bypass transistors, each bypass transistor connected in parallel with a corresponding light emitting diode for selectively diverting current away from said corresponding light emitting diode.

30. An electrical device as in claim 29, wherein the control circuit includes operational amplifiers connected to the bypass transistors for selectively turning each bypass transistor on and off.

31. An electrical device as in claim 29, further including a backup capacitor for powering the control circuit in absence of AC power, and wherein the backup capacitor is connected in series to the light emitting diodes such that a current for energizing the light emitting diodes also charges the backup capacitor.